surface area to which the mold compound can adhere, the aperture 66 improves the performance characteristics and reliability of the leadframe-based CSP similarly to the features of the first embodiment.

Figure 2D is a cross-sectional view of the leadframe-based CSP according to a third embodiment of the present invention. The leadframe-based CSP shown in Fig. 2D is identical to the leadframe-based CSP in Fig. 2B, except for an aperture 67. As shown in Figure 2D, in this embodiment, the aperture 67 is formed using a combination of a full etch process and a half etch process and increases the adhesion surface area for the mold compound, thereby improving the leadframe-based CSP.

Figure 3 is a plan view of a leadframe-based CSP 80 according to a fourth embodiment of the present invention. As shown in Figure 3, the leadframe-based CSP 80 includes a leadframe 70 including a die attach pad 72 centrally located therein and a plurality of wire bonding pads 74 peripherally located therein, one or more dies 76 mounted on the die attach pad 72 using bonding materials 71, a plurality of bonding wires 78 for electrically connecting the dies 76 and the wire bonding pads 74, and a mold compound (not shown) for encapsulating these components in a package structure.

In this embodiment, there are a plurality of apertures 85a, 85b, 85c located in the die attach pad 72. These apertures 85a, 85, 85c (collectively 85) have an oval shape and extend vertically or horizontally, but can extend in any direction, e.g., diagonally. The apertures 85 can be formed partially or fully through the die attach pad 72 as discussed above using a full etch process, half etch process, a combination of full and half etch processes, any other suitable etch process, stamping, coining, or any other suitable lead-

frame manufacturing process. The apertures 85 provide a greater surface area to which the mold compound can adhere. This prevents introduction of contaminants and moisture into the package and improves the electrical characteristics of the package.

According to the present invention, the aperture (e.g., aperture(s) 65, 66, 67, 85) formed in the die attach pad of the leadframe-based CSP can be formed in any shape, configuration, or size using conventional etching processes, as long as the aperture increases the adhesion surface area in the die pad area for the mold compound. For example, the aperture can be a rectangle, an oval, a circle, a square, a triangle, or any combination therefore. Further, the aperture can be located at any location in the die attach pad regardless of a die location, e.g., between the dies or adjacent to die(s). Moreover, a plurality of such apertures may be formed in the die attach pad (e.g., as shown in Fig. 3). All these variations are contemplated as part of the present invention.

Accordingly, the present invention provides at least one aperture in the die attach pad of a chip package for increasing the adhesion surface area for the mold compound in the die attach pad area, whereby it prevents the degradation of the MSL of the leadframe-based CSP, the introduction of contaminants such as dusts into the leadframe-based CSP, and the occurrence of electrical short circuits in the leadframe-based CSP. The present invention further improves the RF grounding characteristics of the chip package.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.